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IS 4410-13 (1985): Glossary of terms relating to river valley projects, Part 13: Operation, maintenance and repair of river valley projects [WRD 21: Safety in Construction, Operation and Maintenance of River Valley Projects]



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( Reaffirmed 2001 )

*Indian Standard*

GLOSSARY OF TERMS  
RELATING TO RIVER VALLEY PROJECTS

PART 13 OPERATION, MAINTENANCE AND REPAIR  
OF RIVER VALLEY PROJECTS

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# *Indian Standard*

## GLOSSARY OF TERMS RELATING TO RIVER VALLEY PROJECTS

### PART 13 OPERATION, MAINTENANCE AND REPAIR OF RIVER VALLEY PROJECTS

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Terminology Relating to River Valley Projects  
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### GLOSSARY OF TERMS RELATING TO RIVER VALLEY PROJECTS

#### PART 13 OPERATION, MAINTENANCE AND REPAIR OF RIVER VALLEY PROJECTS

#### 0. FOREWORD

**0.1** This Indian Standard ( Part 13 ) was adopted by the Indian Standards Institution on 28 February 1985, after the draft finalized by the Terminology Relating to River Valley Projects Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** A number of Indian Standards have already been published covering various aspects of River Valley Projects and a large number of similar standards are in the process of formulation. These standards include technical terms and precise definitions of terms which are required to avoid ambiguity in their interpretation. To achieve this end, the Sectional Committee on Terminology Relating to River Valley Projects has brought out 'Glossary of terms relating to river valley projects ( Part 13 ), which contains definitions of terms relating to operation, maintenance and repair of River Valley Projects.

**0.3** All the definitions taken from Multilingual Technical Dictionary on Irrigation and Drainage, are acknowledged by asterisk ( \* ) in the standard.

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#### 1. SCOPE

**1.1** This standard ( Part 13 ) covers the definitions of terms relating to operation, maintenance and repair of river valley projects.

#### 2. DEFINITIONS

**2.1 Bank Strengthening, or Strengthening of Banks\*** — A general term which includes, widening, raising and straightening of banks of a channel; and also forming by silting tanks, banks of a new channel passing through low ground.

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**2.2 Benching\***

- a) Act of providing additional section to a bank at curvatures, or at low lying points where cattle crossings exist; and
- b) Ledges shaped like steps or terrace formed below beds of canals and under the seats of banks in high filling for proper bonding of earthwork with the natural ground.

**2.3 Berm** — A shelf that breaks the continuity of a slope.

**2.4 Berm Trimming\*** — Cutting away the overgrown, overhanging portion of the berm to restore it to its final regime shape.

**2.5 Bolster** — A bag of broken stones enclosed in a wire cage used in the construction of an underwater embankment for assistance in closing of breaches or checking erosion, or filling of scours below or adjoining hydraulic structures in rivers or canals.

**2.6 Borrow Area\*** — A source from where material is borrowed to complete a section or make fills.

**2.7 Borrow Pits** — An excavation for the purpose of obtaining filling material.

**2.8 Breach** — Break through, or gap caused in an embankment, flood levee or earthen dam by water.

**2.9 Bushing** — An obstruction made of bushes, twigs of trees, leaves, etc, projecting, from or along the sides of the channel to intercept silt.

**2.10 Caulk\*** — To drive, force, or pour oakum, lead, mortar, or other material into joints to seal them against leakage.

**2.11 Caving** — The collapse of the part of a bank caused by undermining due to the wearing away of the toe of the bank by the action of flowing water. Also applied to the falling in of the concave side of a bend whose curvature is changing.

**2.12 Catwalk** — A narrow perched footway along a structure.

**2.13 Compaction** — The densification of a soil usually by hand rammers or by mechanical manipulation.

**2.14 Consolidation\*** — A gradual reduction in volume of a soil mass under saturated conditions resulting from an increase of compressive stress.

**2.15 Concrete Disintegration\*** -- Actual separation or breaking up of the concrete itself, that is, the breaking down of the mass from any cause whatsoever, for example, breaking up of the mass due to freezing of entrapped moisture, disruption or loss of cementing value of the paste by solution or chemical action and breaking up through disintegration of the aggregates themselves.

**2.16 Concrete Replacement Method\*** — A method of repairing concrete work by filling in concrete in the holes when they extend entirely through the concrete section or are deeper than the reinforcement.

**2.17 Cracks\*** — Fissures or openings, named according to their shapes, causes, location, not necessarily extending through the body of the structure.

**2.18 Creep** — The creep is used for one of the following happenings:

- a) Slow movement of rock debris or soil usually imperceptible except to observations over long duration;
- b) The gradual permanent deformation of matter, either in solid or particle form, under stress which does not disappear or reversed when the stress is removed;
- c) Gradual deformation of concrete under stress; and
- d) The gradual yielding ( deformation ) of concrete under a constant sustained load, at even very low stresses. Although partly recoverable, it continues for an indefinite time at a continuously diminishing rate. Sometimes also referred to as plastic flow.

**2.19 Dam Safety Inspection** — It is to locate the causes of potential distress affecting safety of dam and allied structures and to recommend suitable remedial measures. Including expenses of staff and other overhead expenses.

**2.20 Dry Pack** — A mixture of cement and sand/fine aggregate in a specified ratio, used for repair work of concrete, such as in holes of bolts, grout inserts, narrow slots cut for the repair of cracks, neither suitable for filling in back of considerable lengths of exposed reinforcement nor for filling holes which extend entirely through the wall, beam, or bulk head; hence dry-pack method.

**2.21 Flame Cleaning** — A method of cleaning metal surface by passing an oxyacetylene flame over the surface.

**2.22 Grout** — Fluid or fluid mixture of cement and water or cement, sand/fine aggregate and water that may be poured or injected under pressure.

**2.23 Inspection\*** — Careful examination, during one or more visits, of the conditions and functioning of structural components of river valley projects, the principal purposes being: (a) to verify the safety of structures and facilities and disclose warning signals of their likely failure, (b) to disclose conditions that might cause disruption or failure of operation, (c) to determine the adequacy of the canal sections, structures and other facilities to serve the purpose for which they were designed and are being used, (d) to note the extent of deterioration as the basis for planning, maintenance, repairs or remodelling, (e) to obtain

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operating experience, data for improvement of design construction, maintenance and operation practices, (f) to suggest action in respect of repairs or measures necessary to keep the canals in good operating conditions.

**2.24 Internal Silting System\*** — A method of bank strengthening, in which canal banks are initially set back from the normal section of the canal channel. Inducements are laid down to encourage the deposit of silt internally on the berms; it can only be applied to a new canal which is so constructed.

**2.25 Long Reach System\*** — A method of bank strengthening, generally, adopted in low ground, similar in construction to in and out system except that the cross banks are constructed at greater intervals. In operation, the whole canal supply is diverted into each compartment at a time to effect silt deposition.

**2.26 Maintenance\*** — The operations performed in preserving irrigation or drainage canals, hydraulic structures, service roads, and works in good or near-original condition to derive the intended benefits.

**2.27 Maintenance Cost\*** — The cost of maintaining structural components of river valley projects. Including expenses of staff and other overhead expenses.

**2.28 Mortar-replacement Method\*** — A method of repairing concrete used for holes too wide to dry pack and too shallow for concrete replacement and for all comparatively shallow depressions, large or small, which extend no deeper than the far side of the reinforcement bars nearest to the surface.

**2.29 Patching\*** — Repairing or restoring small isolated surface areas.

**2.30 Plugging\***

- a) Filling up a hole with a suitable material or piece,
- b) Any piece or material used to stop or fill a leak hole, and
- c) A sealing of concrete or other materials to prevent flow.

**2.31 Pickling\*** — The process of removing a coating of scale, oxide, tarnish, etc, from metal objects, so as to obtain a chemically clean surface; effected by immersing in an acid bath.

**2.32 Piping**

- a) The movement of soil particles by water flowing through soil leading to the development of underground channels, and
- b) Formation of passage by water under pressure in the form of conduits through permeable materials in natural way or under hydraulic works including embankments when the hydraulic head exceeds a certain critical value.

**2.33 Pitching or Beaching\*** — A protective covering of properly packed or built-in-materials on the earthen surface slopes of irrigation canals, drainage channels, river banks, etc, to protect them from the action of water. The more solid facing of retaining wall protection required in river or sea works is referred to as revetment, while, pitching covers rip-rap and other protection to river as well as to irrigation and drainage channels.

**2.34 Pneumatically Applied Mortar\*** — A mortar of Portland cement and sand applied by pneumatic pressure against the surface or lining to be or being treated, used for large scale repair and restoration of old structures; hence pneumatically applied mortar method.

**2.35 Popping\*** — A type of spalling which occurs on a concrete surface from some expansive force originating in the mass, but near the surface. Usually caused by expansion of a piece of aggregate either from moisture or temperature changes. May also be caused by swelling of a lump of clay or piece of wood.

**2.36 Prepacked Concrete\*** — Concrete made by forcing mortar into the voids of a compacted mass of clean, graded coarse aggregate. After compaction and just prior to grouting, the aggregate, is wetted or preferably inundated with water. As the mortar is pumped into the forms, it displaces the water and fills the voids, thus creating a dense concrete having a high content of aggregate. Prepacked concrete has been used in the resurfacing of dams and the repair of tunnel linings, piers and spillways. It is particularly well adapted for these types of repairs and for underwater construction. The prepacked method of placing concrete is patented.

**2.37 Prepacked Concrete Method** — A repair method using prepacked concrete for deteriorated concrete, especially used for large repair jobs, when underwater placement is involved or when conventional placing of concrete would be difficult.

**2.38 Prewetting, or Premoistening\*** — Keeping the concrete surface wet for a few hours for proper bond before repairing material is applied.

**2.39 Raveling, or Unraveling\*** — A term applied to a type of concrete disintegration in which the concrete appears to be breaking up through disruption of the mortar or loss of bond, leaving at any stage coarse aggregate particles which are partially embedded.

**2.40 Reconditioning of Hydraulic Structure\*** — Modifying an existing structure, such as by reshaping the entry conditions, providing transitions, strengthening floors, to make it safe for the existing or changed flow conditions.

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**2.41 Reconstruction** — Rebuilding when the whole or a major part of a structure is damaged or washed away replacement of flexible aprons as well as other minor repairs are, however, covered under routine maintenance.

**2.42 Remodelling ( Channel )** — It is the process of altering or changing the elements of existing channels and hydraulic structures with a view to correcting/rectifying/modifying their design, or to enable them to pass increased or decreased supplies.

**2.43 Renewals** — Extensive repairs over practically the entire structure, including replacement of damaged portions without involving any increase in the original capital value.

**2.44 Repairs\*** — The restoration or mending of embankments, hydraulic structures, roads, buildings, etc, involving no increase in the original capital value. More extensive than patching but less than renewals.

**2.45 Rip-Rap** — It is the protection to the embankment material against erosion due to wave action, velocity of flow, rainwash, wind action, etc, provided by placing a protection layer of rock fragments or manufactured material.

**2.46 Roofing\*** — The void spaces created locally between a hydraulic structure and its foundations due to settlement.

**2.47 Routine Maintenance or Annual Repairs**

- a) Repairs or maintenance works done by routine, regular or periodic temporary labour provided for the purpose; and
- b) Repairs or maintenance work done annually or periodically.

**2.48 Rust Removers\*** — Acid solutions that are applied on metal surfaces to remove oxide contaminations on the surfaces or to convert them (oxide, contamination) to innocuous films. Frequently used in maintenance of painting of small isolated areas where rusting is light.

**2.49 Sand Bag\*** — A bag filled with sand, silt, or earth used for closing of breaches, or to form temporary check dam. Sometimes filled with concrete and used for the same purpose as rip-rap.

**2.50 Sand Blasting\*** — A method of removing all surface impurities from old metal surface and consists of forcible driving under pressure of hard particles of sand causing controlled erosion of the surface against which the blast is directed. The treatment not only removes all surface impurities, including tight mill scale, but also imparts an etched texture and a largely increased bonding area. If steel grit (crushed shot) is used instead of sand, the method is called gritblasting.

**2.51 Scaffold or Scaffolding\*** — A temporary erection used in the construction, alteration or demolition of a structure, to support or to allow the hoisting and lowering of workmen, their tools and materials.

**2.52 Scour** — The erosive action, particularly pronounced local erosion, of bed and banks running water in streams in excavating and carrying away material from bed and banks. Scour may occur in both earth and solid rock material.

**2.53 Seepage**

- a) The slow movement of gravitational water through the soil,
- b) The percolation of water through soil, and
- c) Infiltration seepage from canals and reservoir occurs in the form of percolation under positive pressure.

**2.54 Silting\***

- a) The process of accretion by filling up or raising of the bed of channel by water-borne sediment flowing in it. Also called accretion of silt. Building up of sides of a channel by silt constricting the normal waterway is also referred to as silting or berming, but not accretion of silt;
- b) A physical control measure effected by diverting a silt-bearing stream in low lying lands, marshes, loops, etc, to fill them up and thus to reclaim them from mosquito breeding; and
- c) Silting of reservoir-gradual accumulation of silt in the reservoir.

**2.55 Silt Clearance\*** — Removal and disposal of the silt deposited in a channel section above the designed bed level; clearance may be up to designed bed or confined to levels higher than the designed bed levels. In the latter case, it is called partial silt clearance. The general term also includes berm trimming in the event of constriction of width by silting.

**2.56 Silt Ejection** — The process of hydraulic ejection of silt through silt ejector.

**2.57 Sloughing** — It means falling out of side slopes of seepage drains due to :

- a) low angle of repose of wet soil,
- b) exit gradient of seepage water exceeding the critical gradient, and
- c) velocity of inflow being greater than the critical velocity which would lift up the soil particles.

**2.58 Spalling\*** — Act or process of chipping or breaking of canal sections or hydraulic structures due to water action or structural causes.

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**2.59 Special Maintenance\*** — Repairs or maintenance work done under special sanctioned estimate ( not normal estimate) for the purpose.

**2.60 Undermining, or Undercutting\*** — Cutting away at the base, or underpart, of a hydraulic structure by the action of water.

**2.61 Unusual Conditions, or Emergency Conditions\*** — In operation and maintenance a term construed to mean canal bank failures, generator failures damage to transmission lines or other physical failures or damages or acts of God, or of the public energy, fire, floods drought, epidemics, strikes, or freight embargoes or conditions, causing or threatening to cause interruption of water or power service.

**2.62 Wet Sand Blasting\*** — An operation adopted for cleaning up joint surfaces in concreting by the use of pressurized water-sand mixture. This is usually followed by thorough watering of the surfaces.

**2.63 Wire Brushing\*** — Cleaning of metal surfaces with a brush to remove all surface rust, dust, and loose scale. It cannot be expected to remove embedded oxides or tight mill scale, as will blast cleaning.



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